

APPLICATION NO. 09/826,117

TITLE OF INVENTION: Hybrid Walsh Codes for CDMA

INVENTOR: Urbain A. von der Embse

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CLAIMS

WHAT IS CLAIMED IS:

Claim 1. (cancelled)

Claim 2. (cancelled)

Claim 3. (cancelled)

Claim 4. (cancelled)

Claim 5. (cancelled)

Claim 6. (cancelled)

Claim 7. (currently amended) A method for the generation of hybrid Walsh complex orthogonal codes for CDMA and for the plurality of other applications, said method comprising:

means for deriving the inphase permutation of the Walsh or

Hadamard codes which places them in the sequency correspondence which is the rate of phase rotation correspondence with the frequency and in the even code correspondence with the inphase component codes of the discrete Fourier transform (DFT),

means for deriving the quadrature permutation of the Walsh or

Hadamard codes which places them in the sequency correspondence which is the rate of phase rotation correspondence with the frequency and in the odd code correspondence with the quadrature component codes of the DFT,

means for using the said inphase permutation to generate the
inphase component codes of the said hybrid Walsh codes,
and
means for using the said quadrature permutation to generate
the quadrature component codes of the said hybrid Walsh
codes.

Claim 8. (currently amended) Said codes in Claim 7 have
properties comprising:

code chips take values $\{1+j, -1+j, -1-j, 1-j\}$ in the complex
plane,
code chips with a renormalization and rotation of the code matrix
take values $\{1, j, -1, -j\}$ in the complex plane,
inphase axis codes of the said codes are reordered Walsh or
Hadamard codes,
quadrature axis codes of the said codes are reordered Walsh or
Hadamard codes, and
codes have fast encoding and decoding algorithms,

Claim 9. (currently amended) A method for the generation of
generalized hybrid Walsh orthogonal codes for CDMA and for the
plurality of other applications, from code sets which include
hybrid Walsh, Hadamard, Walsh, discrete Fourier transform DFT,
pseudo-noise PN, and the plurality of codes, said method
comprising:

means for generating the said codes using tensor product
techniques for codes selected from the plurality of
code sets,
means for generating the said codes using direct product
techniques for codes selected from the plurality of
code sets,

means for generating the said codes using functional combining techniques for codes selected from the plurality of code sets, and
means for generating the said codes using combinations of tensor product techniques, direct product techniques, and functional combining techniques for codes selected from the plurality of code sets.

Claim 10. (currently amended) A method for the generation of complex orthogonal codes for CDMA and for the plurality of other applications, said method comprising:

means for deriving a inphase permutation of the Walsh or Hadamard codes or codes from the plurality of real codes,
means for deriving a quadrature permutation of the Walsh or Hadamard codes or codes from the plurality of real codes,
means for using the said inphase permutation to generate the inphase component codes of the said complex codes, and
means for using the said quadrature permutation to generate the quadrature component codes of the said complex codes.